Lecture Module - Introduction

ME3023 - Measurements in Mechanical Systems

Mechanical Engineering

Tennessee Technological University

Topic 3 - Experimental Test Plan

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- Parameter Design Plan
- System and Tolerance Design Plan
- Data Reduction Design Plan
- Experimental Design Strategies
- Small Group Activity

Parameter Design Plan

Parameter Design Plan: Determine the test objective and identify the process variables and parameters and a means for their control.

Ask:

- What question am I trying to answer?
- What needs to be measured?
- What variables and parameters will affect my results?

Text: Theory and Design of Mech. Meas.

System and Tolerance Design Plan

System and Tolerance Design Plan: Select a measurement technique, equipment, and test procedure based on some preconceived tolerance limits for error.

Ask:

- In what ways can I do the measurement?
- How good do the results need to be to answer my question?

Text: Theory and Design of Mech. Meas.

Data Reduction Design Plan

Data Reduction Design Plan: Plan how to analyze, present, and use the anticipated data.

Ask:

- How will I interpret the resulting data?
- How will I use the data to answer my question?
- How good is my answer?
- Does my answer make sense?

Text: Theory and Design of Mech. Meas.

Experimental Design Strategies

- Randomized Tests
- Repetition and Replication.
- Concomitant Methods

Small Group Activity

Group Activity: Find a group of 2-3 students. Complete the activity and submit your work on ilearn *as an indiviual*. You may submit the same or similar answers as your group members.

Experimental Test Plan: Fuel/Energy Economy

1. Develop an experimental test plan for determining the milage cost of your vehicle (choose any vehicle) in dollars per mile. Write a short desciption of the system. (paragraph or bulleted list)

2. Identify the following variables for your plan.
   - Measured Variable:
   - Independent Variable(s):
   - Dependent Variable(s):
   - Controlled Variable(s):
   - Extraneous Variable(s):

3. Do you expect the results of the study to represent the true milage of the vehicle? How could you validate (or check) the results?

4. What could you do to improve the results of the proposed study?